

REMARKS

Claims 1-4, 7-13, and 16-26 were pending in this application when the present Office Action was mailed. Claims 1-4, 7-12, 16-22, 25, and 26 have been amended. More specifically, claims 1, 10, and 22 have been amended to clarify certain aspects of these claims. Claims 2-4, 7-9, 11, 12, 16-21, 25, and 26 have been amended merely to correct the antecedent basis of certain features of these claims. New claim 29 has been added. Accordingly, claims 1-4, 7-13, 16-26, and 29 are currently pending in the application.

In the Final Office Action mailed January 12, 2006, claims 1-4, 7-13, and 16-26 were rejected. More specifically, the status of this application in light of the January 12 Office Action is as follows:

(A) Claims 1-3, 7-13, 17-22, 25, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,825,201 to Watanabe et al. ("Watanabe") in view of Published U.S. Patent Application No. US 2003/0016198 to Nagai et al. ("Nagai");

(B) Claims 8, 9, 20, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, and in further view of Published U.S. Patent Application No. US 2004/0066515 to Ott ("Ott");

(C) Claims 4 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, and in further view of a technical paper entitled "Digital Imaging Colorimeter for Fast Measurement of Chromaticity and Luminance Uniformity of Displays" by Jenkins et al. ("Jenkins"); and

(D) Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, in further view of Published U.S. Patent Application No. US 2004/0179208 to Hsu ("Hsu").

The undersigned attorney wishes to thank the Examiner for engaging in a telephone conference on May 10, 2006 to discuss the present Office Action, the Watanabe and Nagai references, and a proposed amendment to claim 1. During the

course of the telephone conference, the undersigned attorney and the Examiner discussed some of the distinctions between the pending claims and the teachings of Watanabe and Nagai. The following remarks summarize and expand upon the results of the May 10 telephone conference, and they also reflect any agreements reached between the undersigned attorney and the Examiner during the telephone conference.

A. Response to the Section 103 Rejection of Claims 1-3, 7-13, 17-22, 25, and 26

Claims 1-3, 7-13, 17-22, 25, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al. ("Watanabe") in view of Nagai. As set forth in detail below, the applied references of Watanabe and Nagai cannot support a Section 103 rejection of claims 1-3, 7-13, 17-22, 25, and 26 for at least the reason that these references, either alone or in combination, fail to teach or suggest all the claimed features.

1. Independent Claim 1 is Directed to a Method for Calibrating a Visual Display Module Including *Inter Alia*, Locating and Registering Multiple Subpixels of the Sign, Determining Chromaticity and Luminance Values for each Registered Subpixel, Converting the Chromaticity and Luminance Values for Each Subpixel to Tristimulus Values, and Calculating Correction Factors for Each Registered Subpixel

Independent claim 1, as amended, is directed to a method for calibrating a visual display module. The method includes analyzing a visual display module having an array of pixels and corresponding subpixels and locating and registering multiple subpixels from the visual display. The method then includes determining a chromaticity value and a luminance value for each registered subpixel and converting the chromaticity values and luminance values to tristimulus values. The method further includes converting a target chromaticity value and a target luminance value for a given color to tristimulus values. The method then includes calculating correction factors for each registered subpixel based on a difference between the measured tristimulus values and the target tristimulus values and sending the correction factors to the visual display module.

2. The Applied Art

In the Office Action, the pending claims were rejected based on the assertion that it would have been obvious to combine Watanabe's display device and adjustment means with Nagai's image display apparatus and control system.

a. Watanabe Discloses a Display Device Having Adjustment Means

Watanabe is directed to a display device having a number of display panels arranged together to form a large picture image screen and an adjustment mechanism for correcting the displayed images. Referring to Figure 1 of Watanabe, this reference includes a plurality of display units 1 operably coupled to a remote box 4 functioning as a correction signal generating means. The remote box 4 includes an indicator 5 specifying one or more display units 1 to be corrected and remote-controlled adjustable volumes 6 for selecting the appropriate correction value. Watanabe's system further includes a controller 8 configured to receive the correction signals from the remote box 4 and transmit the signal to the corresponding display unit 1. (Watanabe, col. 3, lns. 3-27.) Referring to Figure 5, Watanabe discloses an optical measuring device 12 that

measures the brightness and color tone of each of the display units 1 one by one . . . [and] the result of the measurement is supplied to the correction-value determining device 13, which in turn transmits to the controller 8 the correction signals of the value to be corrected and of the position of the display unit to be corrected.

(Watanabe, col. 5, lns. 53-57; emphasis added.) Watanabe further teaches that, after the display units 1 are corrected, the measuring device 12 again measures each of the display units one by one with the measuring device.

b. Nagai Discloses an Image Display Apparatus Having Light Emitting Elements and a Control System for Adjusting the Chromaticity and/or Luminance of the Light Elements

Nagai is directed to an image display apparatus having light emitting elements corresponding to a plurality of color tones and a control system for correcting variations in the chromaticity and/or luminance of the light elements. Referring to Figure 3 of Nagai, this reference discloses a display portion 10 having a plurality of light emitting elements (e.g., LEDs) arranged in a matrix, a correcting data storing portion 32 for

storing data necessary to correct the luminance and chromaticity of the display portion 10, and a correcting data control portion 31 for transferring the stored correction data to the display portion 10. (Nagai, [0082]-[0085].) Nagai discloses that the correcting data storing portion 32 can store (a) white balance correcting data and plane luminance correcting data, (b) pixel luminance correcting data, and (c) chromaticity correcting data. (Nagai, [0084].) The stored correction data can be uploaded to the display portion 10 and used to adjust each LED within the display portion 10.

3. Watanabe and Nagai Cannot Support a Section 103 Rejection of Claim 1 for at Least the Reason that These References, Either Alone or in Combination, Fail to Teach or Suggest all the Claimed Features

Independent claim 1 includes locating and registering multiple subpixels from a visual display module. The method then includes determining a chromaticity value and a luminance value for each registered subpixel and converting the chromaticity values and luminance values to tristimulus values. The method further includes converting a target chromaticity value and a target luminance value for a given color to tristimulus values. Neither Watanabe nor Nagai teach or suggest these features. Indeed, the Office Action correctly notes that Watanabe "does not explicitly teach analyzing, determining, adjusting and calibrating chromaticity and luminance nor does he teach analyzing, determining, adjusting calibrating at the pixel level." (Final Office Action, p. 3.) To cure this deficiency, the Office Action relies on Nagai. More specifically, the Office Action asserts that Nagai discloses "an image display device capable of analyzing, determining, adjusting and calibrating the chromaticity and luminance values at the pixel level of the display." (Office Action, p. 3.) Nagai, however, also does not teach all the claimed elements. For example, nowhere does Nagai teach or suggest locating and registering multiple subpixels from the visual display. Furthermore, Nagai does not teach or suggest (a) converting the chromaticity and luminance values for each measured subpixel to tristimulus values, or (b) converting a target chromaticity value and a target luminance value for a given color to tristimulus values. In fact, based on the undersigned's review of the Watanabe and Nagai references, there is no mention whatsoever of tristimulus values. Thus, Watanabe and Nagai, either alone or in

combination, fail to teach or suggest all of the claimed features. Accordingly, the Section 103 rejection of claim 1 should be withdrawn.

Watanabe and Nagai cannot support a Section 103 rejection of claim 1 for the additional reason that one of skill in the art would not be motivated to combine the teachings of Watanabe with the teachings of Nagai. The MPEP states that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination." (MPEP § 2143.01; emphasis added.) Here, the prior art does not suggest the desirability of the combination. In fact, the prior art teaches away from the combination proposed by the Office Action because Watanabe's process is much too slow to be used in Nagai's system for adjusting each pixel of the display. As discussed above, for example, the optical measuring device 12 of Watanabe measures the brightness and color tone of each of the display units 1 one by one and the resulting measurement is sent to the correction-value determining device 13. Further, after measuring and correcting all of the desired display units 1, Watanabe further requires measuring each of the display units 1 a second time. The image displays of Nagai, however, can include thousands of individual LEDs within each display. For example, the Background of Nagai discusses a large-scale display having over 300,000 pixels. It would be impracticable to use Watanabe's "one by one" system for such displays. Additionally, it would be further impracticable to repeat the process a second time, as required by Watanabe. Accordingly, a person of skill in the art would not be motivated to combine Nagai's system for measuring and correcting image displays having thousands of pixels with Watanabe's system for sequentially measuring and adjusting each individual display unit of a visual display sign.

Claims 2, 3, and 7-9 depend from base claim 1. Accordingly, Watanabe and Nagai cannot support a Section 103 rejection of claims 2, 3, and 7-9 for at least the reason that these references cannot support a Section 103 rejection of base claim 1, and for the additional features of these dependent claims. Therefore, the Section 103 rejection of dependent claims 2, 3, and 7-9 should be withdrawn.

Independent claims 10 and 22 include several features generally similar to claim 1 (e.g., locating and registering multiple subpixels of the module, converting the chromaticity values and luminance values for each registered subpixel to tristimulus values, converting a target chromaticity value and a target luminance value for a given color to tristimulus values). Accordingly, these claims are allowable over the applied references for at least the reasons discussed above with respect to claim 1, and for the additional features of these independent claims. Therefore, the Section 103⁹ rejection of claims 10 and 22 should be withdrawn.

Claims 11-13 and 17-21 depend from base claim 10 and claims 25 and 26 depend from base claim 22. Accordingly, Watanabe and Nagai cannot support a Section 103 rejection of claims 11-13, 17-21, 25, and 26 for at least the reason that these references cannot support a Section 103 rejection of corresponding base claims 10 and 22, and for the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 11-13, 17-21, 25, and 26 should be withdrawn.

B. Response to the Section 103 Rejection of Claims 8, 9, 20, and 21

Claims 8, 9, 20, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, and in further view of Ott. Claims 8 and 9 depend from base claim 1 and claims 20 and 21 depends from base claim 10. Ott fails to cure the above-noted deficiencies of Watanabe and Nagai to support a rejection of claims 1 and 10. Accordingly, dependent claims 8, 9, 20, and 21 are allowable over Watanabe, Nagai, and Ott for at least the reasons explained above, and also because of the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 8, 9, 20, and 21 should be withdrawn.

C. Response to the Section 103 Rejection of Claims 4 and 16

Claims 4 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, in further view of Jenkins. Claim 4 depends from base claim 1 and claim 16 depends from base claim 10. Jenkins fails to cure the above-noted deficiencies of Watanabe and Nagai to support a rejection of claims 1 and 10. Accordingly, dependent claims 4 and 16 are allowable over Watanabe, Nagai, and Jenkins for at least the reasons explained above, and also because of the additional

features of these dependent claims. Therefore, the Section 103 rejection of claims 4 and 16 should be withdrawn.

D. Response to the Section 103 Rejection of Claims 23 and 24

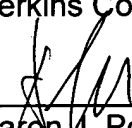
Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe and Nagai, in further view of Hsu. Claims 23 and 24 depend from base claim 22. Hsu fails to cure the above-noted deficiencies of Watanabe and Nagai to support a rejection of claim 22. Accordingly, dependent claims 23 and 24 are allowable over Watanabe, Nagai, and Hsu for at least the reasons explained above, and also because of the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 23 and 24 should be withdrawn.

Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant respectfully requests reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3982.

Respectfully submitted,

Perkins Coie LLP



Aaron U. Poledna
Registration No. 54,675

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Correspondence Address:

Customer No. 25096
Perkins Coie LLP
P.O. Box 1247
Seattle, Washington 98111-1247
(206) 359-8000